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Title: Using Aquatic Insects for Water Quality Biomonitoring

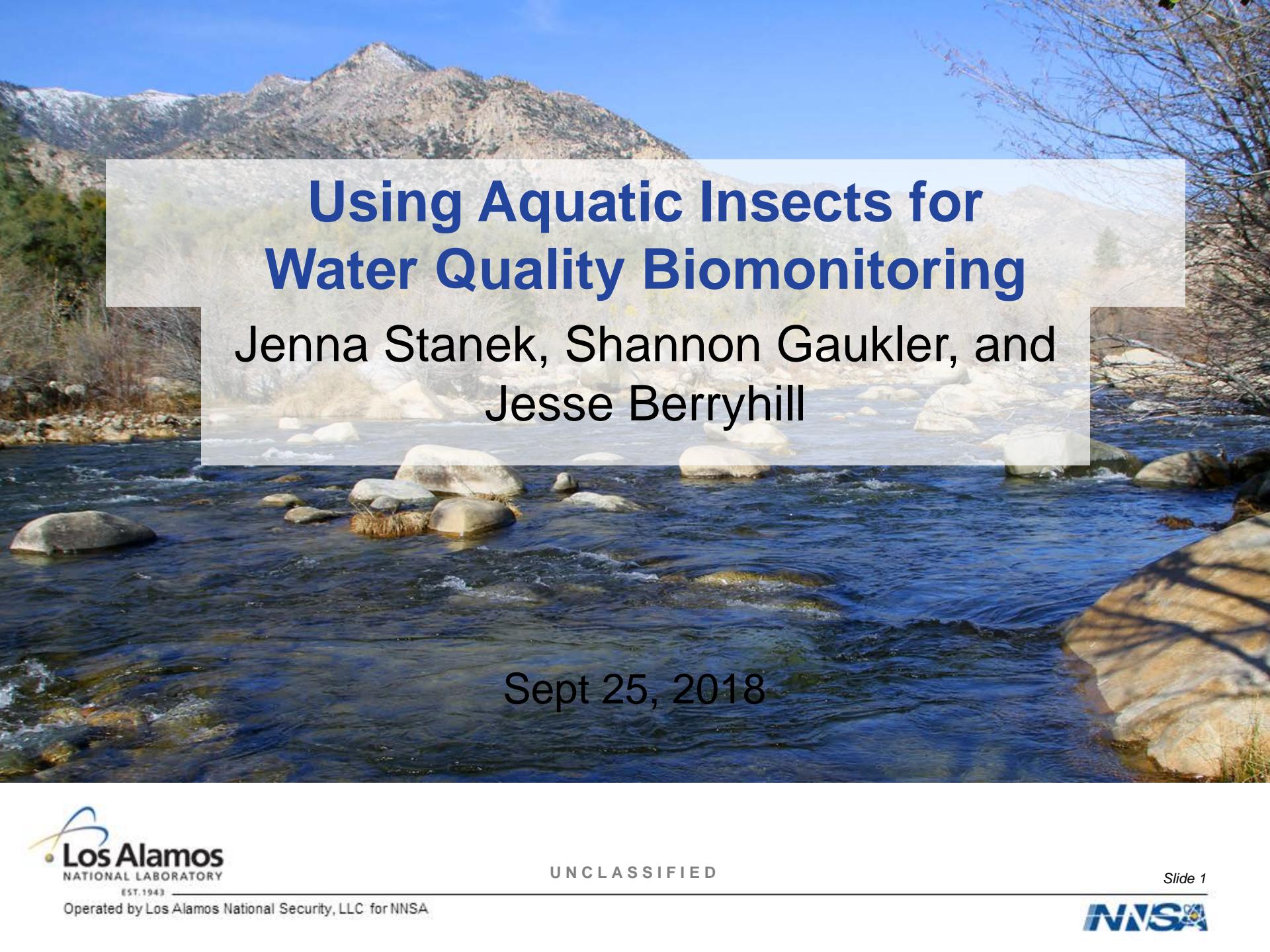
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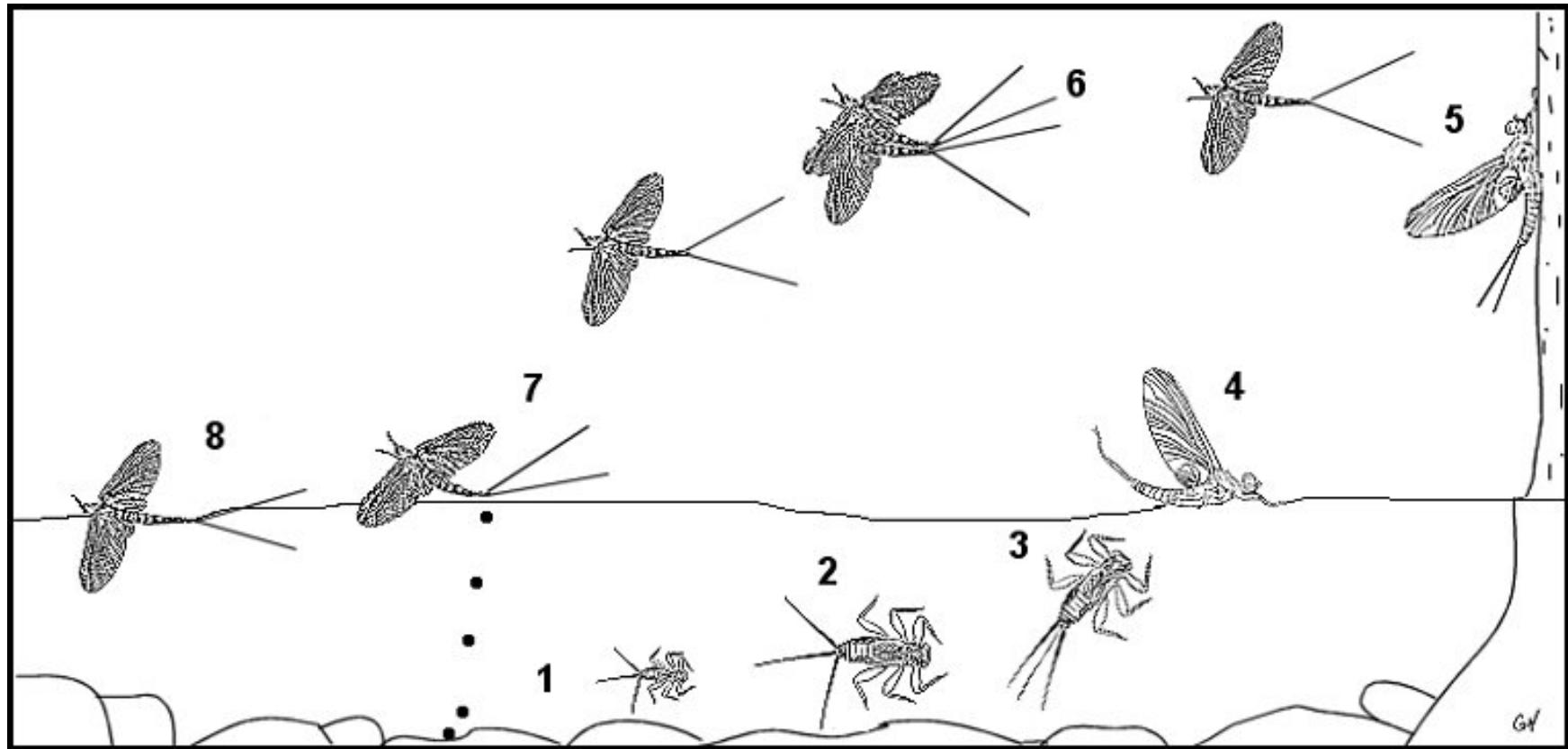


Using Aquatic Insects for Water Quality Biomonitoring

Jenna Stanek, Shannon Gaukler, and
Jesse Berryhill

Sept 25, 2018

Aquatic Insect Life Cycle



How do aquatic insects breathe?

- Gills
- Breathing Tubes
- Air bubbles



What do aquatic insects eat?

- Predators – Eat other insects
- Shredders – Eat algae/leaves
- Grazers/Scrapers – Eat algae
- Filterers – Fine particles in water



Why is water quality important?

- Drinking water
- Wildlife
- Recreation
- Agriculture



What affects water quality?

- Urbanization
- Logging
- Pesticide/fertilizer runoff
- Mining
- Non-point source pollution
- Erosion
- Waste water discharges

Why aquatic insects?

- Ubiquitous (found everywhere)
- Diverse, with varying tolerances
- ‘Easy’ to sample and identify
- Short life cycles – quick responses
- Spend majority of their lives in water



Figure 7.20. *Epeorus* (Heptageniinae) larva

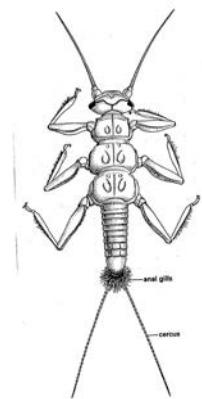


Fig. 9.1 A stonefly nymph (Plecoptera: Geloptygidae) showing filamentous anal gills.

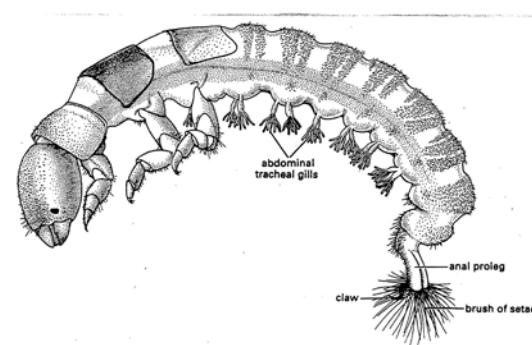


Fig. 9.4 The net spinning larva of the caddisfly *Cheumatopsyche* (Trichoptera: Hydropsychidae).

Tolerance Values

- Indicator organisms – will show if there is a change in habitat quality
- Range of tolerance - Certain insects are pollution tolerant others are very sensitive



Pollution
sensitive



Pollution
tolerant

Assessing water quality

- Collect a sample of aquatic insects
- Identify aquatic insects
- Add up assigned tolerance values for the sample
- Water quality rating given based on tolerance values



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Pollution Sensitive Insects

- Stoneflies, Mayflies, Caddisflies, and others...



In between tolerance

- Craneflies, dragonflies, damselflies, and more...



Dragonfly



Damselfly



Cranefly
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Scud



Beetle Larvae



Watersnipe

Pollution Tolerant Insects

- Aquatic worms, midges, blackflies, and more...



Stream Study: Sample Record and Assessment

Macroinvertebrate Count

Sensitive	Somewhat Sensitive	Tolerant
<input type="checkbox"/> caddisfly larvae <input type="checkbox"/> hellgrammite <input type="checkbox"/> mayfly larvae <input type="checkbox"/> gilled snail <input type="checkbox"/> riffle beetle adult <input type="checkbox"/> stonefly larvae <input type="checkbox"/> water penny larvae	<input type="checkbox"/> beetle larvae <input type="checkbox"/> clams <input type="checkbox"/> cranefly larvae <input type="checkbox"/> crayfish <input type="checkbox"/> damselfly larvae <input type="checkbox"/> dragonfly larvae <input type="checkbox"/> scuds <input type="checkbox"/> sowbugs <input type="checkbox"/> fishfly larvae <input type="checkbox"/> alderfly larvae <input type="checkbox"/> watersnipe larvae	<input type="checkbox"/> aquatic worms <input type="checkbox"/> blackfly larvae <input type="checkbox"/> leeches <input type="checkbox"/> midge larvae
Total # of boxes checked x 3 = _____ index value	Total # of boxes checked 2 = _____ index value	Total # of boxes checked 1 = _____ index value

WATER QUALITY RATING

Excellent (>22)

Fail (11-16)

Total Index Value = _____

Good (17-22)

Poor (<11)

Questions?

